

CLAIMS

What is claimed is:

1. A steering column assembly comprising:
 - a mounting bracket including longitudinally extending spaced sidewalls having inner surfaces facing toward one another,
 - a release bracket having longitudinally extending spaced connecting walls interposed between said sidewalls with each of said connecting walls including a rearwardly-opening primary notch,
 - a steering column mounted to said release bracket, and
 - shear capsules removably disposed within each of said primary notches and fixed to said mounting bracket for coupling and supporting said release bracket against separation from said mounting bracket in response to application of axial shear force below a predetermined threshold valve, and being responsive to application of an axial sheer force above said threshold valve to cause said capsules to separate from said release bracket to permit longitudinal movement of said release bracket relative to said mounting bracket in the direction of said shear force,
 - each of said sidewalls of said mounting bracket including a secondary notch, said shear capsules connected to said mounting bracket by being disposed within a selected one of said secondary notches for interconnecting said connecting wall with said sidewalls.

2. An assembly as set forth in claim 1 wherein each of said primary notches has top and bottom edges, diverging in a rearward direction at a predetermined angle and each of said capsules has top and bottom surfaces, diverging in a rearward direction at the same angle as said top and bottom edges, of a selected one of said primary notches and slidably engaging said top and bottom edges, of said notch.

3. An assembly as set forth in claim 2 wherein one of said top and bottom edges, of each of said primary notches has an indentation and each of said capsules includes a hole, a shear pin disposed within said hole and extending through said indentation for normally resisting collapse of said steering column and shearing in response to the collision event for releasing said connecting wall from said capsule.

4. An assembly as set forth in claim 3 wherein each of said secondary notches has upper and lower edges, diverging in a rearward direction at a predetermined angle and said top and bottom surfaces, of each of said capsules have grooves therein slidably engaging said upper and lower edges, of said secondary notch.

5. An assembly as set forth in claim 1 and including a tab disposed on each of said sidewalls adjacent said secondary notch and extending transversely from said sidewall in abutting engagement with said capsule.

6. An assembly as set forth in claim 5 wherein said tab and said capsules each have a bore, extending therethrough, a bolt received within said bores, to thereby rigidly anchor each of said capsules to a selected one of said tabs.

7. An assembly as set forth in claim 6 wherein each of said sidewalls includes an end edge interconnecting said upper and lower edges, said tab extending from said end edge at a perpendicular angle to said sidewall.

8. An assembly as set forth in claim 7 wherein said bolt extends parallel to the longitudinal axis of said mounting bracket.

9. An assembly as set forth in claim 1 wherein said release bracket includes a housing engaging said connecting wall for receiving a selected one of said capsules therein.

10. An assembly as set forth in claim 9 wherein said mounting bracket includes a plate interconnecting said sidewalls, a guide extending from said plate and frictionally engaging said housing for guiding movement of said housing upon release of said connecting wall from said capsule.

11. An assembly as set forth in claim 10 wherein said guide comprises a ridge extending parallel to the longitudinal axis of said mounting bracket.

12. An assembly as set forth in claim 11 and including an energy absorbing device interconnecting said release bracket and said plate for absorbing energy upon movement of said release bracket relative to said mounting bracket in response to the crash condition.

13. An assembly as set forth in claim 12 wherein said primary notch has top and bottom edges, diverging in a rearward direction at a predetermined angle and each of said capsules has top and bottom surfaces, diverging in a rearward direction at the same angle as said top and bottom edges, of a selected one of said notches and slidably engaging said top and bottom edges, of said notch.

14. An assembly as set forth in claim 13 wherein one of said top and bottom edges, of said primary notch has an indentation and said capsule includes a hole, a shear pin disposed within said hole and extending through said indentation for normally resisting collapse of said steering column and shearing in response to the collision event for releasing said connecting wall from said capsule.

15. An assembly as set forth in claim 14 wherein each of said secondary notches has upper and lower edges, diverging in a rearward direction at a predetermined angle and said top and bottom surfaces, of said capsule have grooves therein slidably engaging said upper and lower edges, of said secondary notch.

16. A steering column assembly comprising;

 a mounting bracket for attachment to a vehicle subassembly and including a plate having spaced parallel sidewalls extending therefrom,

 a release bracket having spaced parallel connecting walls interposed between said sidewalls,

 a steering column having an outer jacket carried by said release bracket,

 at least one of said connecting walls including a rearwardly-opening primary notch having top and bottom edges, diverging in a rearward direction at a predetermined angle with at least one of said top and bottom edges, including an indentation therein,

 at least one of said sidewalls including a rearwardly-opening secondary notch having upper and lower edges, diverging in a second rearward direction at a second predetermined angle and an end edge interconnecting said upper and lower edges,

 a shear capsule disposed within said primary and secondary notches, for interconnecting said connecting wall with said sidewall, said capsule having a bore and a hole therethrough, top and bottom surfaces, diverging in a rearward direction at the same angle as said top and bottom edges, of said primary notch for slidably engaging said top and bottom edges, and grooves for slidably engaging said upper and lower edges, of said secondary notch,

a shear pin disposed within said hole and extending through said indentation for normally resisting collapse of said steering column and shearing in response to the collision event for releasing said connecting wall from said capsule,

a tab having a bore and extending from said end edge at a perpendicular angle to said sidewall in abutting engagement with said capsule,

a bolt received within said bores in said capsule and said tab and extending parallel to the longitudinal axis of said mounting bracket,

a housing carried by said release bracket and engaging said connecting wall for receiving said capsule therein,

at least one guide extending from said plate parallel to the longitudinal axis of said mounting bracket and frictionally engaging said housing for guiding movement of said release bracket upon release of said connecting wall from said capsule, and

an energy absorbing device interconnecting said release bracket and said plate for absorbing energy upon movement of said release bracket relative to said mounting bracket in response to the crash condition.